

THE THERAPEUTIC VALUE OF SOME OF THE MINERAL
WATERS OF THE UNITED STATES UPON
MALARIAL DISEASES;

WITH RULES FOR THEIR USE.

By W. C. VAN BIBBER, M.D.,
OF BALTIMORE.

THE effect of bad air upon the human system is shown in various ways, the differences depending upon the particular kinds of air which cause the diseased conditions. Salubrious situations on the earth are known and recognized mainly from certain characteristics of the human inhabitants. It is true that other air-breathing animals are injuriously affected by bad air, but this comparative study is not within the scope of the present paper.

Many of the changes in health and grades in constitution produced by climate upon man are well known, and those peculiarities of disease existing in the inhabitants of different atmospheric planes have not escaped observation. The practising physician and climatologist will do well to study the effects of hills and mountains upon the human organism, for they exercise influences not to be accounted for by the chemical analysis of the air. By far the greatest number, as well as the most serious diseases, produced by the quality of the air alone, are found to originate in the lower strata of the air—that is, at an elevation but little above the level of the sea. It is true most of the inhabitants of the earth live in these lower strata, because most of the great cities of the world are built upon navigable waters, and the most fertile lands are found in alluvial formations.

It is believed that the plane of the atmosphere 350 feet above tide water is, for the most part, free from that mysterious something which produces ague and fever. A few noteworthy exceptions may be found to this law, but the planes of the atmosphere, from tide level to a height of ten thousand feet, have already been studied as to the production of certain diseases, and the curing of others, and the work is still going on. This is one of the chief problems of the science of climatology, and one result of these observations shows that certain symptoms and individual appearances, accompanied by constant pathological changes,

are found with us, only as a rule, upon the ocean slopes and large river bottoms, and all seem to be identified with this particular atmospheric plane.

To state the matter more precisely, we may say that, if a thousand men should be selected and taken from our sea-board swamps and river bottoms, below the thirtieth parallel of latitude, and placed side by side with a thousand men selected from a plane of the atmosphere over 350 feet above tide water, north of the thirtieth parallel of latitude, the one set of men can be distinguished from the other set by the practising physician, both whilst the men are living as well as by an examination of the organs of the cadavers. Again, it is believed that, should the men from the hills and those from the swamps change abodes for a few years, corresponding changes would take place in their physical peculiarities and outward appearance. These peculiar individual changes are wrought in a gradual manner by time, and, until recently, it seemed to be by an undetected hand; yet the changes are none the less certain and well marked.

It is the changes which will take place in the thousand men transferred from the hills to the swamps which will now engage our attention. These changes steal along in the human system, for a time possibly without noticeable manifestation, until, finally, a culmination takes place, and a chill, a fever and a sweat, ensue in their proper courses. Then what was latent before soon becomes active, and the marked individual appearances begin to manifest themselves. These are, externally, a sallow and stretched skin; muddy-colored conjunctivæ, dry hair, dry and brittle nails, emaciation, a stooped, curved, and shrunken figure, and a slow crumbling of the teeth. The peculiar sensations or feelings which accompany these external appearances, are a gradual loss of strength and vigor, a desire to recline and rest, torpor of mind as well as of body. As mental effects we notice loss of ambition, indecision, procrastination, superstition, a craving for stimulants, with a continuous belief in "biliousness." These symptoms come on slowly, and may continue for years without relief, because they seldom, or never, of themselves produce death, though their effects are serious and far-reaching; and, as will be seen hereafter, the three largest and most important organs of the body are so altered in texture and function that there is, comparatively speaking, but little of the physiological man left. It is no wonder, therefore, that there should exist under these circumstances a predisposition to pneumonia or other fatal affection. So that, when from some intercurrent disease, or from accident, death does ensue, the liver is found enlarged, generally softened, but

sometimes indurated, and always changed in color, being filled with a black substance, called "pigment. The spleen is likewise enlarged, softened, and changed in color. The marrow of the bones is also altered in color and consistence; and a peculiar crescent-shaped micro-organism has been found in, and around the red blood-corpuscles which is thus described, in a letter to me by Surgeon George H. Sternberg, U. S. A. He says:

"In response to your questions I would say that the parasite discovered by Laveran in the blood of malarial fever patients presents itself in various forms. Some in the interior of the red corpuscles, amœboid and segmenting forms, and some free in the serum, crescentic and flagellate forms. That these forms represent different stages in the life-history of the same micro-organism is inferred from the fact that pigment granules are found in all of them, and also from their association in the blood of malarial fever patients, and from the fact that they have not been observed under other circumstances.

"These facts also give strong support to the view, that the parasite in question bears an etiological relation to malarial manifestations. The rapid destruction of red corpuscles during a malarial paroxysm, and the accumulations of dark pigment granules derived from the blood, especially in the liver and spleen, as the result of repeated attacks, is quite in accord with the observations of Laveran, Richard, Marchiafava, Celli, Golgi, Councilman, Osler, and others, relating to this interesting hæmatozoon."

The disease now under consideration was anciently called malaria, because it was universally believed to be due to unwholesome air. At present there is a question whether it comes into the system from the air, or through the water, in those situations where it is found; but there can be no question as to the identity of the affection; and this is the disease which will be considered in this paper.

It is surely a high office for the physician to study additional means of relief for those piteous sufferers from this terrible malady, and no more useful aim can engage the attention of this Society than to unite, in its collected wisdom, during this discussion, in an endeavor to ameliorate suffering such as is familiar to you all. The most important advance in this direction was the introduction into Europe of the cinchona bark about the middle of the seventeenth century, and its properties as a febrifuge were soon widely recognized. Numerous theories have been advanced as to the mode of operation of this remarkable remedy, and still the problem remains unsolved; perhaps only to find a solution when we shall thoroughly understand the diseased conditions for the relief of which it is employed. Three things we may take as definitely settled, viz., that the "Jesuits' powder" is beneficial in these

fevers; that it does not always cure them; and that we neither know why it succeeds nor why it fails. The immense number now suffering from both the acute and chronic forms of this kind of malaria, notwithstanding the most liberal use of the specific remedy, is sufficient to prove conclusively that it has not an absolutely curative effect by itself.

The purpose of this paper is to suggest certain supplementary or auxiliary remedial agents in the treatment of these diseases; and such remedies may be found among the mineral waters of the United States. For more than eighty years the waters of the Greenbrier White Sulphur Springs, in Greenbrier County, Virginia, have had a high reputation for the cure of malarial diseases. The situation of the spring is in a beautiful mountain valley, 1200 feet above tide level. The medicinal virtue of the water is supposed to reside both in its solid and gaseous contents. Bad cases of the kind of malaria which has been described, are to be found visiting this spring every summer for the benefit of its water; and a large proportion of these patients come from the rice and cotton plantations of the seaboard; some from the valley of the Mississippi River and its tributaries; and others from the valleys of the rivers which empty into the Gulf of Mexico. I first visited this spring as a physician in 1851. Since that time I have had opportunities to study and observe the effect of this water upon the kind of malaria which has been described; and my observations have led me to adopt a regular system for its use.

The plans of cure which I shall recommend have been tested upon many patients, and with generally good results. It often happens that those wishing to be benefited cannot remain at the spring longer than from two to four weeks; and to suit this necessity the plans have been called the two weeks' and the four weeks' plans.

That for two weeks consists in drinking as much of the water early in the morning as is necessary to sensibly affect both the bowels and the kidneys—enough to give one or two loose watery movements from the bowels, and a free discharge from the kidneys. For this purpose an average person will require from two to four glasses of the water early in the morning. These should be taken whilst the patient is in active exercise in the open air, and two hours should elapse after drinking the last glass of water before taking breakfast. At noon take a warm bath of the sulphur water, temperature 94° to 98° F., and remain in the bath from fifteen to twenty minutes. Whilst in the bath drink two or three glasses of the sulphur water. The time of the bath should be arranged so as to have dinner or lunch soon after

leaving it, say about two o'clock, which is the usual dinner-hour at the hotel. After this drink two glasses of the water at five o'clock p. m., and two before retiring at night. Wash in the sulphur water morning and night, and exercise freely during the day by walking in the mountains. This two weeks' systematic course has such a decided alterative action that few persons can safely carry it further than the time specified.

In the four weeks' course the bath is ordered every other day, and the amount of the water to be taken may be proportionally moderated. The four weeks' course should always be preferred when time can be given for this purpose. The object of this treatment is to produce a continuous acceleration in the action of both bowels and kidneys, and to increase the activity of the skin. These three objects are undoubtedly accomplished, and during the active course of treatment a good indication of its future success is found in the increased appetite, improved vigor, elevation of spirits, with a feeling of lightness of the body and buoyancy of mind, which are most agreeable. One of the peculiarities of this water, when drank pure from the fountain, is to elevate the spirits with a sensation not unlike that produced by champagne. It causes a slight feeling of dizziness and an excitement of the brain. It may be this which gives a charm to the place, and a lustre to the ball-room, which is not seen elsewhere. But it should always be used with reference to individual idiosyncrasies, either pure from the fountain, or "staled" by the evaporation of its gas according to the valuable rules given by Dr. J. J. Moorman, who was for more than thirty-five years the resident physician at this spring.

The other springs, with the waters of which I have had nearly as long an experience in chronic malarial troubles, are the Saratoga Springs, in Saratoga County, New York. There are now more than twenty-one springs opened at this celebrated place, each one of which has a different chemical analysis. My observations have been more particularly confined to the Congress, the Hathorn, the Hambleton and Washington Springs as drinking waters, and to the Putnam, the White Sulphur, and the Red Springs as bathing and washing waters. From these I have made up a definite course of treatment, which I advise for two weeks and four weeks, similarly to the courses already given for the Greenbrier White Sulphur water, and which, I think, has many advantages.

During the first week of the two weeks' course, as much of the water of the Congress Springs should be taken early in the morning, combined with active exercise, as will produce a decided effect upon the

bowels and kidneys. An average person will require from two to four glasses of this water, and the last glass should be taken about an hour and a half before breakfast. During the second week of this course the Hathorn Spring should be used. Take each day at noon a bath of the Putnam or White Sulphur water, at a temperature of 94° to 98° F., and remain in the bath from fifteen to twenty minutes, drinking whilst in the bath one or two pints of the Hambleton Spring water. At 5 o'clock P. M. take a wineglassful of the Washington Spring water—not more, and at 6 and 10 o'clock P. M. take one or two glasses from the Congress or Hathorn Spring. Wash night and morning in the water of the Red Spring.

This gives a definite course of treatment, the object of which is to produce an alterative effect, and to change rapidly the molecular structure of the body. Few individuals can continue such a course of these waters for a longer period than two weeks. In the four weeks' course, which is always to be preferred, if it is possible, the bath is to be taken every other day, and the amount of the waters taken each day to be proportionally diminished.

In this course of treatment, by the water of either of these springs, the activities of the body are increased in every department, the bowels, kidneys, skin, liver, stomach, mind, and spirits are all safely and agreeably stimulated. It is a full occupation of his time for a patient to undergo this treatment. To most persons it is a delight to experience the sensations resulting from it. The entire body seems to be renewed, and the patient feels confident that the change will be lasting. It is a safe treatment, it is systematized, and may be changed to suit individual cases. If this system is carried out, it may be of service in preventing that blind bathing and drinking which our physicians find so injurious at all the springs in this country, and which is in strong contrast with the practice at similar health resorts in Europe.

Having pointed out two springs which are salutary in malarial troubles, and having given those rules for the use of their waters which I have found most beneficial, I might here let the subject rest; but the disease of which we are treating is such a remarkable one, its literature is so large, its prevalence so widespread, its theories so interesting, that I trust I may be permitted, in conclusion, to say a few words concerning the *modus operandi*, or the manner by which the beneficial effects of the proposed system are produced.

Until about eight years ago everything concerning the cause of intermittent or remittent fever was clouded in obscurity; and everything concerning the manner of its cure was a matter of theory and conjecture. Now a step has been taken in advance which will increase the

interest attached to its treatment. Students in Europe, at the Johns Hopkins University, in Philadelphia, and elsewhere in this country, have made public the results of study and experiment, which bring the whole subject into a new phase; replace fancies by facts, and introduce a new method of treatment. To bring this out clearly, I will place side by side the two explanations of the manner of cure, in order to contrast the old teaching with the new:

The old explanation.

"By the use of the waters, as advised, all the outlets of the body have been opened, and in this way the diseased particles have been removed. What particular path they took to get out of the system is a matter of conjecture; but the result of the treatment is sufficient to prove the fact that they were eliminated by some means or other."

The new demonstration would read in this way.

"The hæmatozoon, which controls the disease, has been found; and a study of its movements will alone reveal the truth. The number of red blood-corpuscles which have been damaged in any particular case can be told by actual count; and the restoration of healthy red blood-corpuscles can be determined in the same way. Under certain favorable circumstances, as at the springs mentioned, the healthy red blood-corpuscles are rapidly formed, and when they are sufficiently abundant and vigorous they dominate the system, resisting both the reception and the encroachments of disease. Those globules which were formed at the two springs, both of which are situated at elevations above the usual melanæmic line, were produced under different and favorable circumstances of air, food, and water. If, during a certain system of treatment, the blood be rapidly brought from a condition of disease to one of comparative health, we may legitimately infer that those globules which have been formed in the progress of the treatment, are of a healthy character; and if we were able before, to detect special vitiation in the red corpuscles, we may expect to find special improvement in these. And this is precisely the result which follows the treatment I am recommending."

Without entering any further into technical detail, I think what has been said represents the present state of our knowledge concerning paludal malaria. The plans which have been advised for its adjuvant treatment, I can recommend to you after an ample experience, and if they should be sanctioned by your reason and used in your practice, I cannot doubt that the benefits will, at least, be equal to what I have mentioned as the result of my own experience.